UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/553,971	11/08/2005	Hans Westmijze	13877/16301	8201

26646 7590 01/05/2010
KENYON & KENYON LLP
ONE BROADWAY
NEW YORK, NY 10004

EXAMINER	
HUHN, RICHARD A	

ART UNIT	PAPER NUMBER
1796	

MAIL DATE	DELIVERY MODE
01/05/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/553,971	WESTMIJZE ET AL.	
	Examiner	Art Unit	
	RICHARD A. HUHN	1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 November 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 13 November 2009 has been entered.

2. Any rejections and/or objections made in the previous Office action and not repeated below are hereby withdrawn.

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office Action.

Claim Rejections - 35 USC § 112

4. Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. As to claim 4: the claim recites the limitation "the second initiator is also added intermittently and/or continuously..." in the first two lines of the claim. The meaning of the word "also" is unclear here, because none of base claims 1-3 and 11 recite that the first initiator is added intermittently or continuously. For examination purposes, the

limitation is interpreted as "the second initiator is added intermittently and/or continuously…".

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 1-8, 11, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 1995-082304 (herein "Amano"). A computer-generated English translation of Amano is referred to herein.

9. As to claim 1: Amano discloses a process to polymerize one or more monomers using an amount of initiator that does not cause an uncontrolled reaction (for example, see paragraph 11) and a second initiator having a half-life of 0.1 hours at the reaction temperature (see isobutyryl peroxide in paragraph 10; and see the reaction temperature

of 57 °C in paragraph 21), wherein the second initiator is dosed at least partially in between the start of the polymerization until 60% (preferably 50%) of the monomer has been polymerized (see paragraph 11). Amano further gives an example in which the second initiator is dosed when 15% of the monomer has been polymerized (see paragraphs 14 and 22).

10. Amano fails (1) to specifically name that at most 90% of a safely useable amount of a first initiator is used. Amano further fails (2) to specifically name a process in which the second initiator is dosed at least partially in between the start of the polymerization until 10% of the monomer has been polymerized. Amano further fails (3) to specifically name a process in which at least 92% of the maximum cooling capacity is used during a period of time in which at least 10 wt% of the monomer is polymerized.

11. However, it is noted that Amano teaches that a reflux condenser is used to prevent the reaction from exceeding a desired temperature (see paragraph 9). It is therefore evident that the operator may adjust the coolant flow through the condenser in order to achieve a desired cooling capacity for the reactor to prevent the reaction from exceeding a desired temperature. Therefore, a person of ordinary skill would have been motivated to use a minimum amount of coolant, including an amount such as at least 92% of the cooling capacity of the reactor is used, in order to avoid wasting the energy necessary to cool any excess coolant in the condenser system.

12. Similarly, Amano recognizes that the condenser is in operation prior to dosing the very reactive initiator in order to prevent the reaction from exceeding a desired temperature (see paragraph 11). Therefore, a person of ordinary skill would recognize

that the very reactive initiator may cause a considerable exotherm. Therefore, a person of ordinary skill would have been motivated to use an appropriate amount of the initiators to prevent the reaction from exceeding a desired temperature.

13. Amano further teaches that the second (very reactive) initiator is used in order to shorten the reaction time (see paragraph 11). Therefore, a person of ordinary skill would recognize that adding the second initiator at an earlier time in the process of Amano would further shorten the reaction time. Therefore, a person of ordinary skill would have been motivated to add the second initiator earlier in the process, including up to the point that 10% of the monomer has been polymerized, so as to further shorten the reaction time.

14. Additionally, Amano recognizes that the second initiator may be added at various points in the polymerization process, such as up to 50% monomer conversion, and further gives an example in which the second initiator is added at 15% monomer conversion. In view of this, a person of ordinary skill would recognize that the point at which the second initiator is added may be optimized to achieve desired results. It is the examiner's position that the point of commencement and the duration of the initiator feed are result effective variables because changing them will affect the type of product obtained, including the resulting polymer's physical properties such as molecular weight, molecular weight distribution, and processability characteristics. Case law holds that "discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art." See MPEP 2144.05(II). In view of this, it would have been obvious to one of ordinary skill in the art to utilize an initiator feed with an

appropriate point of commencement and the duration, including those within the scope of the present claims, so as to produce desired end results, thereby arriving at the presently claimed invention.

15. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the present invention: (1) to have used an appropriate amount of initiators to prevent the reaction from exceeding a desired temperature, including at most 90 wt% of the safely useable amount of a first initiator, as is presently recited; (2) to have added the second initiator at an earlier time in the process, including during the time period in which the second initiator is dosed at least partially in between the start of the polymerization until 10% of the monomer has been polymerized so as to shorten the reaction time; and (3) to have used a minimum amount and flow rate of coolant to reduce the cost of the process, including using an amount such that at least 92% of the maximum cooling capacity is used during a period of time in which at least 10 wt% of the monomer is polymerized, thereby arriving at the presently claimed invention.

16. As to claims 2 and 3: Amano discloses a suspension polymerization of vinyl chloride (see claim 1).

17. As to claims 5 and 12: Amano further discloses the use of protective colloids, such as cellulose derivatives and polyvinyl alcohol (see paragraph 18).

18. As to claim 6: Amano discloses a first initiator having a half-life of 3.1 hours at the reaction temperature (e.g. see bis(2-ethylhexyl)peroxydicarbonate in paragraph 16; and see the reaction temperature of 57 °C in paragraph 21) and a second initiator having a

half-life of 0.1 hours at the reaction temperature (e.g. see isobutyryl peroxide in paragraph 10).

19. As to claims 7 and 8: Amano further discloses that the second initiator may be used in an amount of 0.02 wt% based on the monomer (see paragraph 12), and that the first initiator may be used in an amount of 0.03 wt% based on the monomer (see paragraph 16), which amounts are within the presently recited ranges.

20. As to claim 11: The process of Amano is a batch suspension polymerization (see an example in paragraph 21); this process will necessarily show a pressure drop of the vinyl chloride as the monomer is consumed in the polymerization reaction.

21. As to claim 4: The second initiator is added continuously in the example in Amano (paragraph 21) until the point that the monomer conversion is 40%. At this stage in the polymerization process, the pressure will started to drop.

22. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Amano in view of US Patent No. 6,274,690 (herein "Hoshida").

23. The discussion with respect to Amano as set forth above in paragraphs 9-21 is incorporated here by reference.

24. As to claim 9: As set forth above, Amano suggests the process of instant claim 1. Amano fails to specifically disclose a polymerization method using a reactor with a volume of 15 m^3 or larger. However, it is within the ordinary skill in the art to scale up a known reaction. It is further known in the art to polymerize vinyl chloride in reactors with a volume of at least 15 m^3. For example, Hoshida discloses a method of polymerizing

vinyl chloride monomer with reactors of at least 40 m^3 (see abstract). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the present invention to have scaled up the process suggested by Amano, including conducting the process with commercial-size reactor such as one of 15 m^3 or larger volume as taught by Hoshida, thereby arriving at the presently claimed invention.

25. Claims 1-8 and 10-12 are rejected as being unpatentable over Amano in view of US Patent No. 6,384,155 (herein "Van Swieten"). A computer-generated English translation of Amano is referred to herein.

26. As to claim 1: Amano discloses a process to polymerize one or more monomers using an amount of initiator that does not cause an uncontrolled reaction (for example, see paragraph 11) and a second initiator having a half-life of 0.1 hours at the reaction temperature (see isobutyryl peroxide in paragraph 10; and see the reaction temperature of 57 °C in paragraph 21), wherein the second initiator is dosed at least partially in between the start of the polymerization until 60% (preferably 50%) of the monomer has been polymerized (see paragraph 11). Amano further gives an example in which the second initiator is dosed when 15% of the monomer has been polymerized (see paragraphs 14 and 22).

27. Amano fails (1) to specifically name that at most 90% of a safely useable amount of a first initiator is used. Amano further fails (2) to specifically name a process in which the second initiator is dosed at least partially in between the start of the polymerization until 10% of the monomer has been polymerized. Amano further fails (3) to specifically

name a process in which at least 92% of the maximum cooling capacity is used during a period of time in which at least 10 wt% of the monomer is polymerized.

28. However, it is noted that Amano teaches that a reflux condenser is used to prevent the reaction from exceeding a desired temperature (see paragraph 9). It is therefore evident that the operator may adjust the coolant flow through the condenser in order to achieve a desired cooling capacity for the reactor to prevent the reaction from exceeding a desired temperature. Therefore, a person of ordinary skill would have been motivated to use a minimum amount of coolant, including an amount such as at least 92% of the cooling capacity of the reactor is used, in order to avoid wasting the energy necessary to cool any excess coolant in the condenser system.

29. Similarly, Amano recognizes that the condenser is in operation prior to dosing the very reactive initiator in order to prevent the reaction from exceeding a desired temperature (see paragraph 11). Therefore, a person of ordinary skill would recognize that the very reactive initiator may cause a considerable exotherm. Therefore, a person of ordinary skill would have been motivated to use an appropriate amount of the initiators to prevent the reaction from exceeding a desired temperature.

30. Amano further teaches that the second (very reactive) initiator is used in order to shorten the reaction time (see paragraph 11). Therefore, a person of ordinary skill would recognize that adding the second initiator at an earlier time in the process of Amano would further shorten the reaction time. Therefore, a person of ordinary skill would have been motivated to add the second initiator earlier in the process, including up to the

point that 10% of the monomer has been polymerized, so as to further shorten the reaction time.

31. Additionally, Amano recognizes that the second initiator may be added at various points in the polymerization process, such as up to 50% monomer conversion, and further gives an example in which the second initiator is added at 15% monomer conversion. In view of this, a person of ordinary skill would recognize that the point at which the second initiator is added may be optimized to achieve desired results.

32. Van Swieten teaches that using a reactive peroxide (see col 2 lines 18-45) in the early stage of polymerization allows for fast heating up (see col 2 lines 60-62), and further teaches that dosing the peroxide allows for control of the polymerization rate (see col 2 lines 65-66). In view of Van Swieten, a person of ordinary skill would recognize that adding the second initiator of Amano earlier in the process would allow for faster heating up, thereby shortening the reaction time and increasing throughput of the reactor. Van Swieten further teaches (see col 2 line 14) that the process of Amano may lead to an undesirable amount of residual peroxide in the polymer. Therefore, a person of ordinary skill would have been motivated to optimize the relative proportion of the first (more stable) initiator and the second (less stable) initiator in the process of Amano, including using less of the first and more of the second initiator, so as to minimize the amount of residual peroxide in the polymer.

33. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the present invention: (1) to have used an appropriate amount of initiators to prevent the reaction from exceeding a desired temperature, including at most 90 wt% of

the safely useable amount of a first initiator, as is presently recited; (2) to have added the second initiator at an earlier time in the process of Amano, including during the time period in which the second initiator is dosed at least partially in between the start of the polymerization until 10% of the monomer has been polymerized, as suggested by Van Swieten; (3) to have used a minimum amount and flow rate of coolant to reduce the cost of the process, including using an amount such that at least 92% of the maximum cooling capacity is used during a period of time in which at least 10 wt% of the monomer is polymerized; and (4) to have optimized the relative amounts of the two initiators so as to minimize the amount of residual peroxide in the polymer, as suggested by Van Swieten, thereby arriving at the presently claimed invention.

34. As to claims 2 and 3: Amano discloses a suspension polymerization of vinyl chloride (see claim 1). Van Swieten also discloses a suspension polymerization of vinyl chloride (see col 4 lines 11 and 25).

35. As to claims 5 and 12: Amano further discloses the use of protective colloids, such as cellulose derivatives and polyvinyl alcohol (see paragraph 18). Van Swieten also discloses that the method disclosed therein may include the use of a protective colloid (see col 3 lines 53-55).

36. As to claim 6: Amano discloses a first initiator having a half-life of 3.1 hours at the reaction temperature (e.g. see bis(2-ethylhexyl)peroxydicarbonate in paragraph 16; and see the reaction temperature of 57 °C in paragraph 21) and a second initiator having a

half-life of 0.1 hours at the reaction temperature (e.g. see isobutyryl peroxide in paragraph 10).

37. As to claims 7 and 8: Amano further discloses that the second initiator may be used in an amount of 0.02 wt% based on the monomer (see paragraph 12), and that the first initiator may be used in an amount of 0.03 wt% based on the monomer (see paragraph 16), which amounts are within the presently recited ranges.

38. As to claim 11: The process of Amano is a batch suspension polymerization (see an example in paragraph 21); this process will necessarily show a pressure drop of the vinyl chloride as the monomer is consumed in the polymerization reaction.

39. As to claim 4: The second initiator is added continuously in the example in Amano (paragraphs 21-22) until the point that the monomer conversion is 40%. At this stage in the polymerization process, the pressure will started to drop.

40. As to claim 10: Amano fails to specifically disclose variable dosing of the first initiator in a polymerization using two initiators. However, Van Swieten teaches generally that the initiators may be dosed continuously or discontinuously (see claim 1). It is within the ordinary level of skill in the art to adjust an initiator feed in response to reaction conditions, such as temperature, conversion, pressure, and the like. Therefore, it would have been obvious to a person of ordinary skill at the time of the present invention to have adjusted the initiator feed in the method of Amano by dosing the first initiator at a variable rate as suggested by Van Swieten, thereby arriving at the presently claimed invention.

41. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Amano in view of Van Swieten and Hoshida.

42. The discussion with respect to Amano and Van Swieten as set forth above in paragraphs 26-40 is incorporated here by reference.

43. As to claim 9: As set forth above, Amano and Van Swieten suggest the process of instant claim 1. Amano and Van Swieten fail to specifically disclose a polymerization method using a reactor with a volume of 15 m^3 or larger. However, it is within the ordinary skill in the art to scale up a known reaction. It is further known in the art to polymerize vinyl chloride in reactors with a volume of at least 15 m^3. For example, Hoshida discloses a method of polymerizing vinyl chloride monomer with reactors of at least 40 m^3 (see abstract). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the present invention to have scaled up the process suggested by Amano and Van Swieten, including conducting the process with commercial-size reactor such as one of 15 m^3 or larger volume as taught by Hoshida, thereby arriving at the presently claimed invention.

Response to Arguments

44. Applicant's arguments filed 13 November 2009 (herein "Remarks") have been fully considered and they are persuasive in part.

45. Regarding the rejection of claims 1-12 under 35 USC 112, second paragraph: Applicant argues (pages 4-6 of Remarks) that the specification adequately describes the "safely useable amount" of a first initiator. Upon reconsideration of the definition in the specification, the rejection has been withdrawn.

46. Regarding the various rejections over Van Swieten: Applicants have noted (page 9 of Remarks) that example F of Van Swieten is a comparative example. Upon reconsideration of the reference, the examiner believes there is little motivation to optimize the comparative example. Therefore, the rejections over Van Swieten have been withdrawn in favor of the new rejections over Amano and Van Swieten set forth above. Applicant's other arguments drawn to the Van Swieten reference are therefore moot. However, one point is further addressed here.

47. Applicant argues (page 9 of Remarks) that Van Swieten argues against the process of Amano because the process results in an unacceptably high residue of peroxide in the final polymer. It is firstly noted that the claims, as presently drafted, are open to any amount of residual peroxide in the polymer. Furthermore, because the claims are process claims, any limitation drawn to the residual peroxide in the polymer or other physical properties of the polymer would be functional limitations - such limitations would only limit the present process to the extent that the prior art process is *capable* of producing products having these properties. It is evident from the disclosures of Amano and Van Swieten that a person of ordinary skill could optimize the amount of

both initiators to achieve desired results, including using less of the more stable initiator so as to minimize residual peroxide in the polymer.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RICHARD A. HUHN whose telephone number is (571) 270-7345. The examiner can normally be reached on Monday to Friday, 9:30 AM to 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on (571) 272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/R. A. H./
Examiner, Art Unit 1796

/Vasu Jagannathan/
Supervisory Patent Examiner, Art Unit 1796